being dissolved from the positive plate; and this is changed into sulphate of lead, and afterwards by the current into peroxide of lead. In a few hours the plate is covered with a layer of crystalline peroxide of lead. During the formation, air is forced through the cell, or the plates are lifted from the liquid at intervals. In the absence of data as to the performance of plates formed in this way, it is impossible to compare them with the ordinary 'grid' plates, pasted with red lead by the Faure process. The disadvantages of this last form have been pointed out in a previous number. The type of cell under which that of M. Dujardin comes — the 'Planté' form — generally offers the advantage of quicker discharge rate, and freedom from 'buckling,' as against the greater storage-capacity of the Faure type. How far M. Dujardin has remedied the difficulties of the type outside of the time necessary for formation, remains to be seen.

DISCUSSION OF ALTERNATING-CURRENT TRANSFORMERS. — The papers of Messrs. Kapp and Mackenzie before the English Society of Telegraph Engineers and Electricians have excited a great deal of interest and discussion on the subject of alternating currents. A number of people, many of them directly interested in electric lighting, have spoken on the matter. The majority of the speakers seemed in favor of the system, although it was attacked by Messrs. Gordon and Crompton, who prefer using storage-batteries for distribution. Arguments in favor of the alternating-current system were drawn from the experience of the Westinghouse Company in the States, that would be more weighty on this side of the ocean, if they were known to have been carefully verified. Some results of tests of the efficiency of transformers were given by Professor Ayrton, — the method of testing having been borrowed from our side of the water, — and values of 96 per cent were obtained under the most favorable conditions. As has been pointed out, however, in a former number of this journal, the transformers only work at the maximum efficiency for a short time during the day, so that the average efficiency will not probably be above 80 per cent. Various speakers favored different systems of distribution, but there were very few who had no experience to give; and the discussion was an interesting and instructive one.

BOOK-REVIEWS.

Transactions of the Association of American Physicians. Second session, held at Washington, D.C., June 2 and 3, 1887. Philadelphia, Assoc. Amer. Phys.

THE Transactions of the Association of American Physicians at their second annual meeting in Washington has been published. This association is without doubt the most representative body of the medical profession of the United States, having on its roll of membership the most prominent physicians of the country. The papers which are contained in this volume are of a very high order, and the discussions are exceedingly pointed and valuable.

The treatment of consumption by Bergeon's method, that is, by gaseous enemata, was the subject of three of the seventeen papers, the authors being Edward T. Bruen, M.D.; F. C. Shattuck, M.D., and Henry Jackson, M.D.; and William Pepper, M.D., LL.D., and J. P. C. Griffith, M.D.

Dr. Bruen sums up his views in these words: "I incline to think that suitable climatic environment is an all-important adjunct to the proper settlement of the value of Bergeon's treatment. But it is certainly an important addition to our therapeutic equipment to have an agent capable of influencing very markedly bronchial catarrh in so many cases, especially the 'stay-at-homes.' In a word, Bergeon's method, so far as I have used it, is chiefly valuable in those cases of pulmonary disease attended with bronchial catarrh. But I fear the trouble and detail necessary to its successful use will prevent many from employing the method, and I can easily see that the limitation of the power of Bergeon's method will cause it often to be set aside for other plans of treatment."

Drs. Shattuck and Jackson say, "This method is in no sense a specific for phthisis. If useful, it is only as auxiliary to older and generally accepted methods. The only benefit which we saw in our cases that can fairly be attributed to the enemata was diminution in the amount of the expectoration. The good effects which have unquestionably followed the treatment on this side of the water, as well as in France, are perhaps largely attributable to the stimulus afforded by a novel method of treatment, which is of such a nature that the patient cannot but feel that not only something, but much, is being done for him."

Drs. Pepper and Griffith conclude as follows: "Our conclusions, so far as they can be formulated in a preliminary report of comparatively few cases, are, that the treatment of phthisis by gaseous enemata has had very undue value attributed to it; that it is seldom of any real benefit, but that it may prove serviceable in occasional cases."

Dr. Henry Hun presented a paper on sewer-gas poisoning, with a history of twenty-nine cases. He concludes that it is probable that the following conditions may result from poisoning by sewer-gas: 1. Vomiting and purging, either separately or combined; 2. A form of nephritis; 3. General debility, in some cases of which the heart is especially involved; 4. Fever, which is frequently accompanied by chills; 5. Sore throat, which is frequently of a diphtheritic character; 6. Neuralgia; 7. Perhaps also myelitis of the anterior horns; 8. Zymotic diseases, such as typhoid-fever, pneumonia, diphtheria, cholera, dysentery, cerebro-spinal meningitis, erysipelas, and scarlet-fever (in these cases, undoubtedly, the sewer-gas merely acts as a vehicle for the specific germs); 9. A condition of asphyxia, which in its severe form is characterized by coma, convulsions, and collapse; 10. Puerperal fever; 11. Abscesses; 12. Lymphadenitis; 13. Acute aural catarrh (?).

The only other paper read at the meeting, which was of general interest, was one on methods of research in medical literature, by John S. Billings, M.D., U.S.A. This paper contains a good deal of excellent advice to physicians who desire to read up on any particular subject for the preparation of articles for publication or presentation to medical societies. Dr. Billings thinks that one of the most useful pieces of work which could now be undertaken for the benefit of medical writers and investigators would be the preparation of a dictionary of critical bibliography of medical bibliography, in which should be indicated for each subject, in alphabetical order, a reference to where the best bibliography relating to that subject can be found. This could only be well done by a co-operation of a number of writers, each taking a special field. This useful paper of Dr. Billings closes with a list of forty of the most useful reference-books, commencing with Albertus Haller's 'Bibliotheca Botanica' (1751), and ending with Richard Neale's 'First Appendix to the Medical Digest' (1886).

The other papers which were presented to the association were purely medical, and of little general interest.

Sewage Treatment, Purification and Utilization. A Practical Manual for the Use of Corporations, Local Boards, Medical Officers of Health, Inspectors of Nuisances, Chemists, Manufacturers, Riparian Owners, Engineers, and Rate-Payers. By J. W. SLATER, F.E.S. New York, Van Nostrand. 8°.

THIS octavo of 271 pages is one of the Specialists' Series, of which a number of treatises have already been issued, and of which several more are now in preparation. The title of the book before us is, we think, a little misleading. The reader expects from such a comprehensive title a good deal more than he actually finds when he reads the book. Still, the subjects which the author treats are handled in a very interesting and decidedly original manner, and, when the book has been read through, the reader is surprised that so much has been put into so small a space. Its perusal impresses one with the idea that Mr. Slater is a practical man, and that he writes of that which he knows from personal experience and observation, and not from a closet study of the books of others.

In his preface he refers to the unsettled state of the sewage question. Freezing and heating, concentration and dilution, electrization and magnetizing, the addition of oxidizers and deoxidizers, of ferments and preventives of fermentation recommended, if not actually tried, show the want of any distinct and generally recognized principle. This is still more forcibly illustrated by the fact that since 1846 there have been no less than 454 patents issued for the chemical treatment of sewage. In the space at our disposal it will be impossible to follow the author in detail; but there are some points

which he brings out more clearly than any other writer with whose works we are familiar, and to those we desire to call attention.

In speaking of the London system, he pronounces it a failure. This system he calls Bazalgettism, from the distinguished engineer who has applied it to London. Its essential principle is to discharge either directly into an arm of the sea, or into a tidal river, at the time of ebb-tide. Sewage matters discharged into the river at Barking and Crossness are not pushed out to sea by the combined action of the ebbing tide and current, as was expected, but mingle with the water, and work their way back to points far above the outfalls, thus effecting that pollution which the intercepting sewers and the costly channels running parallel to the river were to have averted. Mr. Slater summarizes the matter as follows: "The Bazalgette process, as applied to London, is a total failure. It involves the utter waste of all the manurial matters in the sewage, it aids in silting up the bed of the Thames, it occasions a nuisance much complained of by the inhabitants of the country below the outfalls on both banks, its cost is exceedingly serious, and it does not even guarantee to the inhabitants of London an unpolluted river." It would be hard to conceive of a more vigorous and thorough condemnation than this which Mr. Slater applies to the sewerage system of London, and he is equally emphatic in reference to the proposed extension of the system to Thames Haven at an expense of $20,000,000.

The disposal of sewage by irrigation meets with no better treatment at his hands. He asks, "Does irrigation effect its object without occasioning annoyance or injury to the inhabitants of the district?" He has never failed to detect an unpleasant odor when passing near an irrigation-field in warm, still weather. At Gennevilliers, near Paris, the odor on calm, autumnal evenings may, without exaggeration, be described as abominable. Mr. Slater also believes that irrigation-fields may produce actual disease in their neighborhood, although he acknowledges that the evidence is somewhat conflicting. Irrigation does not remove germs, and it encourages flies, which act as carriers of these germs, it may be of cholera or typhoid-fever. On this danger from flies the author is very emphatic. He says that some of these insects that have become saturated with putrescent matter, or actual disease-germs, enter our houses and crawl over articles of food. Others settle upon our persons, and inflict malignant wounds. Fatal illness has not unfrequently been traced to the bite of flies which feed on sewage or carrion. These flies being now recognized as among the greatest agents for carrying putrid poisons and disease-germs to the healthy, it is important that all places where they can increase and multiply, and all matters upon which they may feed, should be made offensive to them or destroyed, as the case may admit.

These opinions are sustained by the experiments of Dr. Maddox, published in the *Journal of the Royal Microscopical Society*, by which it was demonstrated that the cholera bacillus can pass in a living state through the digestive organs of flies, and also by the experiment of Dr. Grassi, who showed that when segments of the tape-worm (*Taenia solium*) were placed in water, some of the eggs remained suspended therein, and that in the intestines and excrement of flies that drank of the fluid the eggs were subsequently found. Observations made by other experimenters are also confirmatory of the fact that insects act as carriers of germs and ova of parasites. Mr. Slater believes, too, that sewage-grass is very inferior to normal herbage, and quotes experiments made by Mr. Smee, and published by him in a work entitled 'Milk in Health and Disease,' by which it was proven that milk from cows fed on irrigation-grass became sour and underwent putrefaction much sooner than that from cows fed on grass from an ordinary meadow.

In concluding the discussion of irrigation, the author says that irrigation, though an excellent method of disposing of, and at the same time utilizing sewage, when suitable land is available, where the climate is warm, and the rainfall scanty or intermittent, is not applicable where these conditions are absent. Any attempt to represent it as the only means of dealing with the sewage difficulty, and to force it upon reluctant communities, is a grave error; in fact, a crime, the motives for which are in most cases hard to trace. The methods of sewage-disposal by filtration, precipitation, destruction, distillation, and freezing, are described, and their advantages and disadvantages pointed out.

The author, in concluding his treatise, devotes more than sixty pages to giving an abstract of the specifications of the 454 patents for the chemical treatment of sewage, occasionally adding a note pointing out what he considers to be their defects.

Letters of David Ricardo to Thomas Robert Malthus. Ed. by JAMES BONAR. Oxford, Clarendon Pr. 8°. $2.75.

THE letters in this collection were written between 1810 and 1823, the last of the series being dated only a few days before the writer's death. They are only in a minor degree personal, being mainly devoted to discussing the many questions in political economy on which Ricardo and Malthus disagreed. Unfortunately, the letters that Malthus wrote to Ricardo have never been found; so that we have only one side of the discussion, which is a drawback both to the interest and to the instructiveness of the correspondence. It is true that Ricardo often states his opponent's arguments; but such statements cannot supply the place of Malthus' own words. However, the letters will be very interesting to students of economics, illustrating as they do the views of two of the principal founders of the science. The men were personal friends, and were often in each other's company; but on economic themes they differed widely. They agreed in the main on the subjects of rent and population; but they disagreed on many matters of detail and on some of prime importance. Thus, they differed widely as to the definition of value, and as to the influence of supply and demand on the one hand, and of cost of production on the other, in determining value. They also differed as to the real nature of political economy; Malthus holding that it is an inquiry into the nature and causes of wealth, while Ricardo would confine it to the subject of distribution only (p. 175).

The two leading faults in Ricardo's published works appear with equal plainness in these letters. The first of these is his habit of fixing on one or two economic laws or forces, and tracing out their results without regard to the minor influences which often modify their action. He seems to have been aware himself of this tendency in his thinking; for he remarks in one of his letters that one of the chief causes of the differences between himself and Malthus was that he looked only to the larger and more permanent causes, while his opponent was always thinking of the minor ones. On this point, as on some others, it would have been well if the two friends had been content to learn from each other. The other defect in Ricardo's theories to which we have alluded is his constant assumption that wages are always at the starvation point, so that the slightest increase in the cost of living will necessitate a rise of wages in order that the supply of labor may be kept up. Thus, he argues that a tax on breadstuffs would lead to a rise in wages, and consequent fall in profits; whereas it might only result in reducing the standard of living among the laborers, so that the whole burden would fall upon them.

The friendship between the two correspondents, notwithstanding their difference of opinion, was of the warmest character, as is proved by many passages in these letters, and also by a remark made by Malthus after Ricardo's death, and quoted at the end of this volume. He said, "I never loved anybody out of my own family so much. Our interchange of opinions was so unreserved, and the object after which we were both inquiring was so entirely the truth and nothing else, that I cannot but think we sooner or later must have agreed." We should add, that the book is well edited, and that it contains much information, both in the text and in the notes, about Ricardo and Malthus themselves, and also about other political economists who lived in their time, so that it has a biographical as well as a scientific interest.

Lectures on Electricity. By GEORGE FORBES. London and New York, Longmans, Green, & Co. 12°. $1.50.

A NUMBER of popular works on electricity have been published in the last few years. Some are clearly written, some are interesting, very few are calculated to give correct ideas of the broad principles of the science of electricity.

There are six lectures in Professor Forbes's book, "intended for an intelligent audience, ignorant of electrical science, but anxious to obtain sufficient knowledge of the subject to be able to follow the progress now being made in the science." For its purpose the book is admirable. The simpler phenomena — if we may consider any